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AIR CORPS NEWS LETTER

17TH ATTACK GROUP, MARCH FIELD
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VOL. XX AIR CORPS NEWS LETTER NO. 9.

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The chief purpose of this publication is to distribute information on aeronautics to the flying personnel in the Regular Army, Reserve Corps, National Guard, and others connected with aviation.

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THE ANNUAL MANEUVERS IN PANAMA

By the News Letter Correspondent

THE Panama Canal Department completed its yearly maneuvers, and many phases of air operations were brought out which will be highly beneficial to future operations.

On Sunday morning, March 14th, the war was on, and all Pursuiters of the 19th Wing took off for Rio Hato to establish camp, while all the Bombers were off to Aguadulce, their camp site. Theoretically, this was the Black Force, supposedly carrier-based, but which had succeeded in making a landing in Panama and were attempting to capture the Canal.

For the next two weeks we were all to be very busy firing at all hours and conducting many types of missions. The Pursuit forces assimilated Attack, and in most cases supported Bombardment in their missions, although at various times patrol missions were flown in which Blue Observation ships were sought out and attacked with great delight. Perhaps the most interesting missions flown were the attacks made on various targets by Pursuit (Attack), which by the very nature of the terrain made them highly interesting. Immediately upon designation of a target, all alert pilots would pounce upon maps and quickly decide the best general approach, and then the fun would begin.

Scraping the jungle with its 200-foot trees, the tops of which seemed sufficiently matted to invite a landing, but which are more treacherous than a rattlesnake, keeps one sitting on the edge of the chute and wishing for more eyes than the seemingly meager two provided. The terrain, being naturally rough and abundantly provided with the jungle mentioned above, gave Attack excellent covering which many times enabled them to hit an objective entirely by surprise. Of course, flying P-12's as Attack may not obtain the best results, but it gave us all a good idea of Attack Aviation in Panama, and all true "hedge-hoppers" will get an added thrill, but not without the inevitable added risk. We are all looking forward to our promised A-17's which we may have by July.

Included among Pursuit supporting Bombardment missions was one in which the main objective was to draw searchlight batteries on themselves rather than on the Bombers above. With throttles set at the throttle stop, we started our dive at 8,000 feet. After losing several thousand feet, one searchlight picked us up, and almost immediately lights from all angles were upon us. Diving through occasional wisps of clouds and being completely blinded by the lights, I soon swore that I was hanging by the prop, but keeping my eyes glued on the leader I felt much better when I saw his head duck into the cockpit and get on those good old instruments. Groping around, I finally succeeded in turning my cockpit light on and stole a glance at the instruments myself. All indicators were in the right position, altitude 2,000 feet, and there was a sigh of relief by yours truly. The lights throughout the zone remained on us for about 10 minutes, but the first several minutes seemed years at least.

On one early morning mission, the Bombers encountered a cloud bank and, in attempting to wiggle up through small breaks, succeeded in getting their formation scattered over a large area. Looking back, one amusing incident - not so amusing then - was the predicament in which one officer found himself. Flying along serenely on his leader's lights, he suddenly discovered, much to his amazement, that they were not lights at all but two stars. Anyone having flown formation on a black night following a series of maneuvers can easily see how this can happen. There he was over the clouds with no apparently friendly breaks through which to come down and not certain of his position. There was nothing left to do but fly a compass course in one direction for a certain length of time and then just reverse the procedure; so with the flaps down 20 degrees and engines throttled back, he finally located a break several hours later, and down he came. Taking off at 4:00 a.m., he landed at about 9:00 a.m., with a brand new experience to relate to his grandchildren in later years.

Other interesting incidents occurred during the two weeks, and probably every pilot has a story all of his own which will be related at many tables with necessary diagrams drawn on expensive tablecloths.

Flying, of course, did not occupy all our time, for we had our own private little battle with the mosquitoes. Mosquito bars seemed to be of little avail,

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as scouts no doubt located small openings through which squadrons moved in to attack. Showing us all that they were entirely without fear, their main attack was directed against Lieut. Jack Price, whose bulk of 250 pounds scared them not one bit, so what chance did we poor smaller lads have? No cases of malaria were contracted by Air Corps personnel, however, which was very fortunate in view of the fact that the maneuvers on the Atlantic side had to be cancelled due to excessive cases of malaria.

Pilots and men at Rio Hato were not without recreation, as the best beach in Panama was only two miles from the camp and every spare moment was spent on the beach. A boat enabled a small amount of fishing, which gave us the opportunity to bolster our field ration with fresh corbina, the tastiest fish in Panama.

The maneuvers officially ended on Saturday, March 27th, with a Wing Review flown at France Field. At this time, Brigadier General George H. Brett conveyed the glad tidings of new airplanes for the Canal Zone in the not too distant future. The news of more B-10's and a number of A-17's, to be supplemented by P-26's the first of next year, is music to the ears of foreign duty officers, who have had to be content with Keystones and P-12's since their arrival in Panama.

Brigadier General Frank W. Rowell, Atlantic Sector Commander, also gave a short talk to all officers participating in the Review and congratulated the Air Corps for the fine work and spirit shown throughout the maneuvers. All in all, the Air Corps feels as if the maneuvers were very successful and that a long step towards adequate defense of the Canal had been accomplished.

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DUST STORM OVERTAKES FLYING STUDENTS

Major John V. Hart, Air Corps, senior instructor of the Pursuit Section of the Advanced Flying School, Kelly Field, Texas, spent several anxious hours in the control tower on Wednesday night, April 7th. The forecast had been "cloudy and cooler." The twenty-one Flying Cadets in that section had been dispatched at five-minute intervals on a navigation flight. Ten had been routed: Kelly - Austin - Yoakum - Pawnee - Kelly, and the others in the reverse direction.

Shortly after dark, when Captain Wilfrid H. Hardy, Air Corps, arrived at Austin to check the students, Waco, Tex., reported a dust storm, and Braniff Airlines cancelled their flight north from Austin. This information was telephoned to Kelly Field, but all students had already been dispatched.

Orders were immediately issued over four radio stations for all students to return to Kelly Field, or the nearest airport, on account of this dust storm. However, as only eight planes were equipped with radio, and most of them were out of radio range by that time, this message got through to only four students. The dust storm moved very rapidly, with a wind shift line moving at 40 miles per hour. All the students encountered the dust storm, and nineteen showed excellent judgment in landing at the nearest airport. Two students reached Austin just as the dust moved in there. Eight others landed at San Marcos; two were able to return to Kelly Field, while seven others encountered the dust farther south and returned to Pawnee.

Only two students lost their course. Flying Cadet R.F. Fallows nosed over by excessive use of brakes in making a flare landing near Schulenberg, Texas. Flying Cadet F.J. Black wrecked his airplane and broke his arm when hitting a tree in attempting a flare landing near Caldwell, Texas.

All the students reported in their location before 1:00 a.m., and remained overnight. Lieut. M.F. Stalder, the instructor at Pawnee, and the seven Flying Cadets who landed there, were the only ones who had to rough it. As there are no housing, transportation, or telephone facilities within ten miles of Pawnee, they were forced to spend a rather cold and uncomfortable night sitting around an open fire in a 40-mile wind. However, the whole section returned to Kelly Field the next day, having gained valuable experience.

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GUNNERY TRAINING BY 8TH ATTACK SQUADRON

During the month of April, the 8th Attack Squadron, Barksdale Field, La., was hard at work completing gunnery training, and now can point with pride to its combat teams. Nine pilots of the Squadron, which is commanded by Major Lester J. Maitland, Air Corps, qualified as Expert Aerial Gunners, and each remaining pilot turned in a score which at least qualified him as an Aerial Gunner.

Last fall at the gunnery camp at Fort Crockett, Texas, all the rear seat gunners were qualified with the rating of "Expert." Thus for the first time in two years (due to revision of TR 440-40 and the movement of the 8th Attack Squadron from Fort Crockett, Texas, to Barksdale Field, La.) the squadron has trained combat teams.

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Kelly Field has received some very attractive designs to represent the field. The drawings have created a great deal of interest, and the best one will be selected by vote of the officer personnel and forwarded to Washington for approval.

CROSS-COUNTRY NAVIGATION FLIGHT BY 19TH BOMBARDMENT GROUP
By the March Field Correspondent

WITH the dawn of April 5th, fifteen Martin Bombers of the 19th Bombardment Group, under the command of Lieut. Colonel Hubert R. Harmon and squadron leaders, Majors Albert F. Hegenberger and Walter R. Peck, winged their way towards El Paso and points east on an extended cross-country navigation flight.

The first leg of the trip from March Field, the home station of the 19th Bombardment Group, to El Paso, Texas, was devoted to tactics in "fog flying." Upon advice of the Group Commander that "fog" conditions covering several hundred miles in area had been encountered, flight commanders took over and assigned base altitude, course and rendezvous points for their respective flights. Having been flying in javelin-up position until then, the Bombers now branched off right and left at an angle of 45° for one minute before taking up their new courses. All pilots took to instrument flying until informed by their navigators that the "fog area" had been cleared. All flights continued individually under the guidance of the flight navigators to El Paso. The simulated fog-blind-flying maneuver was completely successful. The Group previously had devoted considerable time to these particular maneuvers, and the results obtained justified all efforts.

After servicing at El Paso, the formation headed for San Antonio, Texas, once the home of all Air Corps pilots. On this leg, the celestial navigators of the Group started to get busy with their sextants. For experimental purposes conditions were ideal, since the air was exceedingly rough and there had been much conjecture as to the results obtainable under such flying conditions. Using three lines of position, a "fix" was obtained just prior to the arrival at San Antonio and was found to be within 15 miles of the dead reckoning position - a most gratifying outcome.

In this connection, it might be brought out that the 19th Bombardment Group makes it a habit to conduct celestial navigation on all their cross-country flights with a view to giving celestial navigators, developed by the Group School the necessary training and practice.

It will be recalled that it was the 19th Group which originally had been instructed to further development of celestial and dead reckoning navigation in the Army Air Corps. Under their care, the first school of that kind was established at Rockwell Field Air Depot. Harold Gatty, of Post and Gatty fame, was at one time instructor there for celestial navigation. Although the 19th Group no longer conducts the navigational school as a prime function, it still remains foremost in the use of such tactics and its employment in practice.

After spending the night at Randolph Field, the formation continued the next morning for New Orleans, La., arriving exactly at the time scheduled. For 40 minutes the planes circled over the city before landing at Shushan Airport. The citizens of New Orleans evinced considerable interest in the Group flight and met the incoming ships at the field. Due to the fact that Army Day was being celebrated in the Crescent City on that date, the 15 smart-looking twin-motored Army planes became the center of attraction in the celebration.

The Committee for National Defense of the New Orleans Chamber of Commerce, who welcomed the Group, made it a point to make the overnight stopover a most enjoyable one for officers and enlisted men.

With the arrival of the Group at Barksdale Field, La., the next day, weather conditions prior to the trip to Oklahoma City, Denver and Salt Lake City were studied, since severe dust storms had been reported in the areas north and west of Shreveport. The Group Commander and the Squadron Commanders thought it best to change the route so as to avoid the prevailing bad weather conditions and to choose a route more to the south on the return trip to March Field.

Immediately after leaving Barksdale Field, the ships encountered severe icing conditions - a mixture of fog and dust in cold air. Carburetor heaters were turned on and instruments were kept under strictest surveillance by all pilots, ready for immediate action in the event that ice should form. However, San Antonio was reached without the slightest trouble or mishap.

Dust was again encountered on the leg between San Antonio and March Field, reaching an altitude of 10,000 feet. The Bombers, after landing at March Field, were actually covered with a blanket of dust, but none the worse off for the experience and performing perfectly throughout. During the five days' cross-country flight, 3,000 miles were covered.

The personnel of the flight greatly enjoyed the test, and are anticipating the coming GHQ maneuvers, when once more "the life in the raw" will be taken up.

The success of the 19th Group flight was due in large measure to the advance work performed by Major James L. Grisham and Lieut. John T. Murtha, who flew ahead to make the necessary arrangements for the Group.

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Captain Mark R. Woodward, Air Corps, is under orders to proceed to his home April 30, 1937, to await retirement.

LANDING FIELDS IN PANAMA

By 1st Lieut. Robert L. Scott, Jr.

STRUNG out inland and on the coast of Panama's 1,000 miles of rugged coast line there are 47 landing fields. Some of these, classed as emergency only, nevertheless are used to advantage several times during every rainy season. These fields extend from Jaque and Pito, nearest South America, to the extreme other end of the Republic, namely, Bocas del Toro and Puerto Armuelles, or from Colombia to Costa Rica.

Only Albrook and France Fields are classed as airdromes, and as detachments can be maintained at only a very limited number of stations, the emergency fields are left very much to themselves except for necessary inspections. About 38 of these fields, classed as "Emergency," extend over a route of approximately 2,000 miles. It is easily understood that in order to visit every field at least once every month, a great deal of flying is necessary. Some of these inspections are routine and only necessary in order to pay off men regularly hired to maintain these fields. Other fields, however, it is necessary to fly in with enlisted men or to leave word at nearby villages that machete men are needed to cut back the jungle and level ant hills.

One of the hardest problems encountered from Darien to Bocas del Toro is to keep our orange windsock on the mast in its proper place rather than have it used as a skirt around some dusky Indian girl. Several times socks have been put up on Saturday, and on Monday, instead of a friendly wind sock leading us in, it could be seen on some native belle leading a flock of admiring bucks around.

On some fields, mostly on the Atlantic side, the jungle will claim a field practically overnight. Fast growing jungle, helped by over 168 inches of rainfall a year, is a real proposition. It has been found that on some sites, such as Pito, Mandingo, Changuinola, and Jaque, the grass must be cut about every sixty days, and even then a ship landing in month old vegetation tries very hard to nose over.

As with the gopher on the western plains of the United States, the hard-working ant is our greatest enemy. There must be several hundred different species here, and they all have a different method of working, which amounts in the long run to different methods of worrying the Air Corps. One type of big ant will eat all the leaves from a fairly large tree in a day, commonly known as the Umbrella Ant. This type of ant is very easily followed in the jungle, as it eats any vegetation in his way and consequently leaves a wide path of destruction. Then there is the Soldier Ant that marches in column and actually destroys everything in his path, such as camping equipment and even building material. Next is the big ant that constructs a hill of concrete-like mud, which is often from two to seven feet high. These hills are gray in color and very hard to see. Ask the pilot who has gone over on his back and then to his chagrin sees the ant hill he just didn't see when coming in to land. A small stick of dynamite and then some gasoline gets them for several months, but like a bad penny they always come back. The ideal system seems that we must interbreed the ants. If we can cross the leaf cutter with the soldier ant so that he will march in great hordes against the vegetation on the fields, then our problem is solved very cheaply. This still leaves the hill builder of the concrete-like abodes, but we'll just have to cross him with dynamite and gasoline in sufficient quantities.

Of course, we have many fields where cattle congregate and must be carefully driven off prior to landing. On some of the fields that are used frequently, the cows and horses get so accustomed to the ships that they just refuse to scare. Under these conditions, the dodging ability of the pilot is tested to the limit.

At the present time, the fields are fairly well scattered and, except for flights to the east and south, we have small worries as to forced landings. There does not, however, seem to be much possibility of ever getting fields between La Hoya (18 miles to the east) and Jaque (165 miles to the southeast). Between these two places there is just jungle, water and mountains. Projects for the near future include fields at Gamboa - half way between Albrook and France Fields - another at Mafafa on the Island of Del Rey in the Perlas Group, with the possibility of a Sailfish Club at some date in the future. A very strategic field is to be constructed near the Navy Radio Station on the tip of the Mala Peninsula. This will give us fields on either shore of the Panama Gulf, and one in the middle on the Perlas Islands, which will give us a very effective net of fields from which to operate if it becomes necessary to protect the Canal.

In closing, it can be said that sooner or later Emergency Landing Fields pay for themselves in Panama, not only for forced landings but to increase our limited training in navigation at this station of foreign duty, also as storage spots for fuel and as radio stations for Weather and Aircraft Warning Service.

PURCHASE OF NEW EXPERIMENTAL BOEING BOMBARDMENT PLANE

AS an indication of the constant desire of the Army Air Corps to explore every potentiality of the airplane in National Defense, there is nearing completion, under Government contract, at the Boeing Airplane Company, Seattle, Washington, a giant Bombardment plane, which promises to be one of the greatest weight-carrying airplanes in the world.

This latest experimental Bombardment airplane comes as a natural successor to the YB-17 type which created such a sensation in its test, and which was popularly labeled the "Flying Fortress." The new plane embodies further developments of the YB-17, which itself ranks among the foremost Bombardment airplanes in the world. It was developed as part of the Air Corps' program in answering a long standing question: What form shall the Bombardment airplane take - a comparatively small, fast, light weight-carrying craft; a larger, maximum weight-carrying machine, or a compromise of the two?

The Air Corps now has examples of two of the three types, - the twin-engine Martin Bombers, representing the smaller, light weight-carrying craft, and the YB-17's, the compromise type. Completion of the new Bomber, representing the maximum weight-carrying machine, will afford the Air Corps the opportunity to compare all three, with a view to determining which type is most desirable from engineering, tactical, and operating standpoints.

Under cover of utmost secrecy, the project has been under way for more than two and a half years. A total of 670,000 man hours of engineering work and shop labor has gone into the construction of this new national defense weapon. The thoroughness with which the project has been carried out is indicated in one of the static tests employed to prove beyond any doubt the correctness of engineering computations. A complete wing panel was built, weighted with lead and "tested to destruction." In the static test of this wing panel the strength requirements were greatly exceeded before it finally broke down.

This latest vehicle of National Defense is a four-engined, all-metal, mid-wing type monoplane, basically similar to the YB-17, although somewhat larger because of its additional weight-carrying capacity.

The plane is powered with four Pratt & Whitney twin Wasp Sr. engines, each giving 1,000 horsepower for take-off, and is provided with the most modern of safety devices, including elaborate radio equipment, automatic pilot, de-icing installations, apparatus for fire protection, wing flaps to reduce its landing speed, a complete heating and ventilating system, and sound-proofing throughout. In addition, it is fitted with air-operated wheel brakes similar to the YB-17 Bomber, both the landing gear and tail wheel being retractable. The first military plane ever built with living accommodations aboard, it contains sleeping quarters, spacious working quarters for personnel, lavatory, kitchenette with electric hot plate, percolator, soup heater and dry-ice box.

All of the above mentioned modern safety, navigation and comfort devices have been incorporated to increase the physical endurance of the personnel and the combat efficiency of the plane for sustained operations.

Thus the Army Air Corps, which in the past, in cooperation with commercial organizations, pioneered in projects later adopted by commercial aviation, has again made its contribution to the progress of civil aviation. This is evidenced when it is realized that, although this airplane was designed to adapt its large weight-carrying capacity to the transportation of military personnel or equipment, it naturally points the way to larger commercial transport planes.

The project of solving the large Bombardment airplane problem was first undertaken by the Army Air Corps during the period 1920-1925. At that time, realizing the necessity for this type of airplane, the Engineering Division, now the Materiel Division of the Air Corps, designed the NS-1, better known as the Barling Bomber. It was a tri-plane with a wing span of 120 feet. It was powered by six Liberty engines, had a maximum speed at sea level of 96 miles an hour, and a service ceiling of 7,275 feet. The plane established world's records of that period for altitude, duration of flight and weight-carrying.

Due, however, to certain objectionable structural features inherent in the wood construction of the period, the project was temporarily placed in abeyance. With the advent of the modern, all-metal, monoplane type of construction, and the increased horsepower of aeronautical engines, the project was again undertaken.

Although many of the details of this latest Bombardment airplane are necessarily clothed in secrecy, due to its experimental nature, it is known, as stated before, that in general appearance it will closely resemble the YB-17 all-metal, mid-wing type of semi-monocoque construction, consisting of longerons, skin stiffeners, bulk heads and smooth outside metal skin. Because of its greater weight-carrying capacity, it will have a greater wing span, and will exceed the 16-ton weight of the YB-17 by approxi-

mately three or four tons.

Its retractable landing gear and tail wheel add materially to its speed, although its maximum and operating speeds will be considerably below those of the YB-17.

It is equipped with electrically controlled multi-position, constant speed three-bladed propellers. The general arrangement of defensive armament is similar to that of the YB-17's, installed in streamlined "blisters" and turrets.

An electric supply comparable to that used in the modern home and factory will traverse the skies in this remarkable new Air Corps Bombardment plane now undergoing final stages of construction in Seattle. In this connection, it will have the distinction of being the first aircraft in the world to carry a full 110-volt alternating current electrical system. Until now, electrical current used in airplanes has been supplied through 13-volt direct current system. The new Bomber's system compares with the old as the common 110-volt current used in cities throughout the world compares with the home-generated low voltage direct current system used by the isolated farmer. It opens a new epoch in aircraft progress.

Two auxiliary gasoline power plants drive the generator supplying this current to the electrically operated parts of the new Bomber. In addition to increased efficiency, a reason for the installation of the system was that power requirements of the Bomber, one of the greatest weight-carrying planes in the world, are so large as to make it impractical to put the electricity generating load on the plane's engine, as has been the method in the past.

There are approximately seven miles of electrical wiring in the Bomber's intricate system. The current is distributed to all electrical devices in the plane with the exception of the ignition, where the conventional magneto system is employed. Among the features included is a complete system of lights which flash as indicators, registering the functioning of various apparatus throughout the plane.

Another feature disclosed, as the new plane is being groomed for its first flight, is the provision for a five-lens aerial camera. The vast possibilities of aerial photography from Bombardment aircraft were indicated in the flight of 1934 of a squadron of Bombing planes from Washington, D.C., to Alaska, when 35,000 square miles were photographed in three days during the trip.

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Special Orders of the War Department, recently issued, announced the promotion of Captain Hugh C. Downey, Air Corps, to the temporary rank of major, Air Corps, from April 13, 1937.

ANNUAL INSPECTION OF KELLY FIELD

Colonel Roy C. Kirtland, Inspector General's Department, finished his inspection of the Air Corps Advanced Flying School, Kelly Field, Texas, on April 20th, and departed that night by train for Washington, D.C. He had been at Kelly Field since April 10th, making the required annual inspection. His comments were that the Air Corps Advanced Flying School was doing an excellent job with the obsolete facilities they had to work with.

Colonel Kirtland, one of the old-timers in the Army Air Corps, has been on duty in the Inspector General's Department, Washington, since July 18, 1936. He was the first graduate of the Army's first pilots' school in 1911 at College Park, Md. Several Army officers had learned to fly shortly before this, but they were instructed either by the Wright Brothers or by Glenn Curtiss.

Stationed at Texas City, near Galveston, Texas, in 1915, Colonel Kirtland was engaged in testing the use of the airplane for observation purposes, in cooperation with the 22nd Infantry, which was also stationed at Texas City. Colonel Arnold M. Krogstad, Commandant of the Advanced Flying School, Kelly Field, and Lieut. Colonel Roy M. Jones, now Executive Officer at Kelly Field, were serving with the 22nd Infantry at that time. Colonel Kirtland also made his first night flight at that time.

Colonel Kirtland wears the "Order of the Crown," a decoration from the Italian Government, and service ribbons for the Spanish-American War, the Philippine Insurrection, the Mexican Border and the World War.

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COMMENDATION FOR ADVANCED FLYING SCHOOL

The following commendation was received from the Chief of the Air Corps by the Commanding General of the Air Corps Training Center, Kelly Field, Texas:

> "The kind and amount of publicity secured by the Air Corps Training Center at the time of the long cross-country flight immediately before graduation (February 1937) was very gratifying to the Chief of the Air Corps. The amount of publicity secured shows the effectiveness of the changed itinerary for the long cross-country flight."

The above was referred to Colonel Arnold M. Krogstad, Commandant of the Air Corps Advanced Flying School, with the following remark by Brigadier General J.E. Chaney, Commanding the Air Corps Training Center:

> "The success attained in this phase of the mission is indicative of the ex-

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VARIETY IS THE SPICE OF LIFE

By the Hamilton Field Correspondent

FOR four Saturdays recently, the 7th Bombardment Group at Hamilton Field, commanded by Lieut. Colonel George E. Stratemeyer, conducted four very interesting and instructive tactical operations in order to test the efficiency of the Group as a whole.

On the first of these Saturdays, the inspection consisted of a Group assembly problem for checking the efficiency of the squadron commanders' crews in navigation. The participating organizations (9th, 11th and 31st Bombardment Squadrons) took off in the early morning, formed a javelin-up formation, and proceeded to the initial point. The location of the Group Assembly point, and the separate routes to be flown by each squadron in arriving there, had been withheld from all personnel taking part in the exercise until just before the take-off; so the Group flew for twenty minutes in formation to the initial point with all the navigators frantically working out their computations in order to rendezvous after leaving the initial point in exactly 80 minutes from the time of take-off.

Major J.G. Taylor, commanding officer of the 31st Bombardment Squadron, was leading the Group formation, and upon arrival over the initial point he dispatched the squadrons on their respective routes to the assembly point. All points were given to the squadrons in latitude and longitude just to make it tough.

Exactly 80 minutes after the take-off, Lieut. Colonel Stratemeyer, who was flying high above the assembly point, checked off the squadrons as they roared into view. The Colonel was the only officer in the air who knew the location of the assembly point before the take-off, and he had proceeded there directly to inspect the completion of the operation. The Group then assembled under the command of the Group Commander and proceeded to Hamilton Field.

On the following Saturday, the Group Commander inspected a bombing mission to destroy an "enemy" aircraft factory located at 38° 03' 18" N and 122° 23' 54" W, which coordinates located the Hamilton Field bombing target in the mudflats of San Pablo Bay. The 9th, 11th and 31st Bombardment Squadrons took off at one-minute intervals, all deadly intent on blowing the "enemy" factory to bits. Each airplane of each squadron flew an individual route to its squadron initial point, so that there was not a single navigator who did not receive practice in his art and who was not partially responsible for the correct performance of the mission. The three squadrons finally formed over three widely separated points in Northern California, and the leading navigator of each squadron directed his squadron to the Group assembly point, departing at exactly 9:00 a.m.

The Group assembly point was designated by latitude, longitude, altitude and time. There were no mistakes. Each squadron appeared like clockwork, and formed in a group column with the 9th Bombardment Squadron, commanded by Captain K.M. Walker, leading the formation and navigating. Upon arrival over the initial point, located just outside the range of the assumed anti-aircraft batteries, the Group echeloned to the right with an interval of a thousand yards between squadrons. At the same time the Group echeloned in altitude from 8,000 to 12,000 feet. Then individual airplanes were echeloned to the right and in altitude so as to allow an interval of 500 yards between each one, and permitting each bomb dropped to be aimed by each bombardier, as well as insuring against a casualty to not more than one airplane by one burst of assumed anti-aircraft.

As the Group approached the target in the attack formation, bombardiers were all busy with their sights, checking drift, opening bomb bay doors, and finally holding the cross hairs on the target in anticipation of a bullseye. The bombing speed had been designated for each airplane, and graduated down from front to rear of the formation so as to prevent any airplane from overrunning the one ahead and below, insuring against the possibility of the higher airplanes dropping bombs on the lower ones.

Because of a scarcity of bombs on the field at that time, only one bomb per airplane was dropped, but the results were such that had there actually been an aircraft factory in that position, it would be there no longer. Bombs sprinkled in and very near to the center of the target, and the anti-aircraft fire was so poorly directed that not a single airplane dropped out of the formation.

After releasing the bombs, each airplane turned sharply to the left so as to depart from the danger area over approximately the same route of attack, and thereby further confuse the anti-aircraft by increasing the targets for the batteries already in action. The Group then rallied over Pinole Point at 6,000 feet and proceeded in formation to Hamilton Field, having passed the tactical inspection to the satisfaction of the Group Commander.

On March 6th, the Group Commander thought up an even better test for his organization, and a high altitude bombing and performance mission was ordered.

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The 9th, 11th and 31st Bombardment Squadrons took off at 30-minute intervals, climbed to the predetermined altitude with a full military load, including five 300-lb. bombs, and began dropping them on the target. The first two passes were made by individual airplanes, and the third pass over the target was a squadron salvo, individually, in which the remaining three bombs were released from each airplane. Everything went smoothly, except that the last squadron to bomb was forced to drop down to a lower altitude after their second pass for the last pass-over. No difficulty, however, was experienced in attaining the required altitude with a full military load, as all airplanes reached it at the proper time without mishap.

On March 13th, Lieut. Colonel Stratemeyer went into a huddle with his Operations Officer, 1st Lieut. F.L. Anderson, and emerged with an entirely new operation to test his Group. A simulated night bombing mission was the exercise scheduled. Prior to the bombing itself, each squadron was ordered to practice airdrome technique and formation flying, which they did with skill and enthusiasm for an hour or more. Old Man Weather put a crimp in the operation, however, by fogging in the assembly point and much of the surrounding country. Squadrons were finally ordered by radio to bomb at a much lower altitude than had previously been designated, but the exercise, which consisted of the dropping of one 300-lb. bomb per airplane, using the flight method of attack, was conducted satisfactorily regardless of the low hanging clouds and mist.

The personnel of the 7th Bombardment Group are wondering what the next tactical inspection will be like. But they are sure of only one thing, and that is that whatever exercise is scheduled it will be unlike any of the others, and no one will suffer from lack of enthusiasm.

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CHEMICAL WARFARE DEMONSTRATION

The 90th Attack Squadron, Barksdale Field, Shreveport, La., dispatched six A-17 Attack airplanes to Fort Benning, Ga., on April 1st, for the purpose of participating in a Chemical Warfare Demonstration at the Infantry School for the instruction of the regular class of students.

The flight was commanded by Captain William N. Amis, Air Corps, the 90th Squadron Commander, and included the following additional pilots: 1st Lieut. Harvey P. Huglin, 2nd Lieut. James H.C. Houston, Air Corps; 2nd Lieuts. John F. Guilmartin and James C. McGehee, Air Reserve, and Flying Cadet Edward F. Cullerton. Six mechanics accompanied the flight.

Due to the lack of sufficient dye, the airplanes were loaded with one tank of dye and one tank of smoke per airplane. The attack was made in column of elements at 3:30 p.m., the time scheduled. The target consisted of "enemy" troops, represented by the students of the Infantry School. The results of the attack were estimated at about 60 percent casualties.

The flight returned to Barksdale Field on April 2nd.

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FILIPINO GENERAL VISITS KELLY FIELD

Major General Basilio Valdes, Deputy Chief of Staff of the Philippine Army, made an unofficial inspection of the Air Corps Advanced Flying School, Kelly Field, Texas, on Monday afternoon, April 19th. He was returning from Mexico City, where he had accompanied President Queson and General Douglas MacArthur.

General Valdes was interested in all student training activities, since flying training is just being started in the Philippine Army. He was especially interested in Observation training and commented favorably on the miniature range, which is used to give students preliminary observation training on the ground. The methods used to teach instrument flying particularly attracted his attention, and he stated that they would purchase a Link Trainer for their use.

Evidencing pleasure in meeting Flying Cadet Jesus A. Villamor, who is a Filipino student in the present class at the Advanced Flying School, he was also happy to renew acquaintances with Major W.E. Richards, Captain W.G. Bryte and Lieut. A.W. Kissner whom he had known in Manila.

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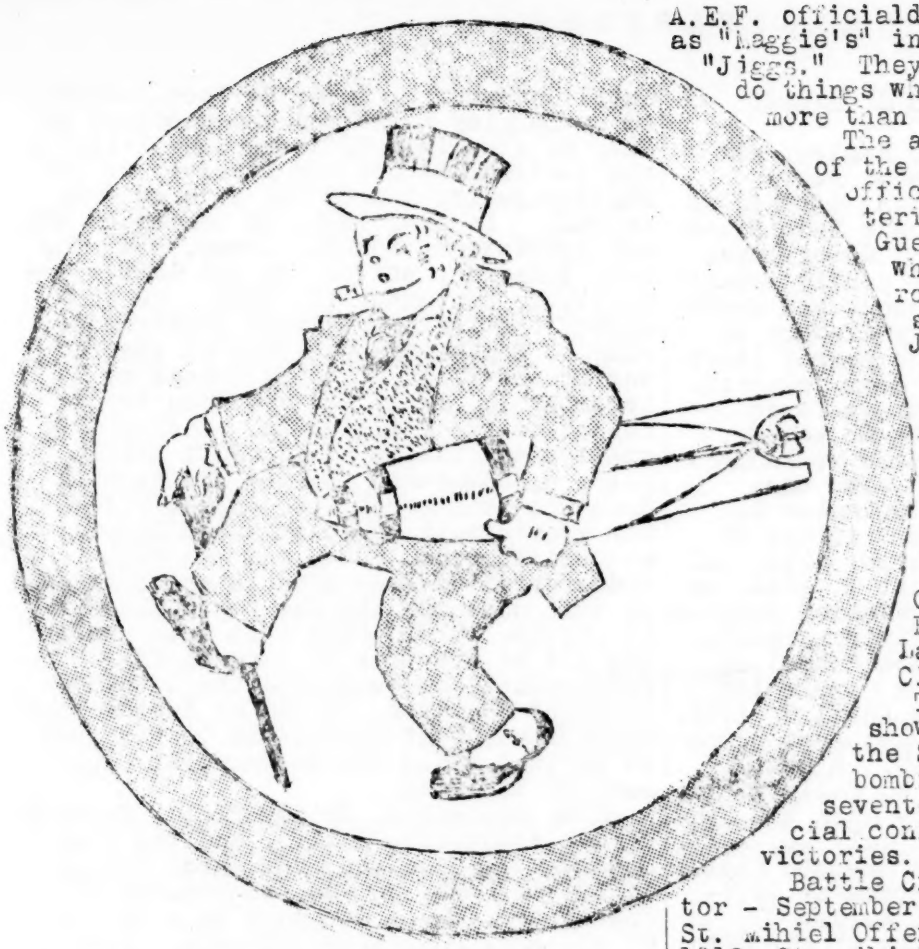
COMMENDATION FOR 8TH ATTACK SQUADRON

Pointing with pride to the excellent record attained by the 8th Attack Squadron with respect to the qualification of its pilots in aerial gunnery, the Barksdale Field Correspondent, touching on other things, states:

"Perhaps our greatest reason for pride is contained in a letter of commendation from Colonel W.H. Frank, Commanding Officer of the Cold Weather Equipment Test Group, which was stationed at Selfridge Field and Oscoda, Mich., last February. To quote Colonel Frank:

'This squadron was outstanding in its operation, showed superior morale, superior airdrome discipline, and superior flying discipline. * * * It is decided to commend him (Major Lester J. Maitland) for the high quality of his work and that of his squadron during the test and to congratulate him upon having one of the most efficient and smoothly operating squadrons that I have ever seen in the service.' We feel that each man perform-

(Continued on Page 11).



INSIGNIA OF 11TH BOMBARDMENT SQUADRON

"Mr. Jiggs" has the distinction of being the only comic character to cover himself with glory in aerial battles over the front lines during the World War, which he gained by riding the nose of the planes of the 11th Aero Squadron as their official insignia.

This was somewhat of a different role from the one known to all the people from Boston to Borneo in the comic strip by George McManus, and the reason for this beginning of a dual existence may necessitate some explanation.

To explain this new role for Jiggs, we must go back to the war time organization of the 11th Aero Squadron in July, 1917, and remember that after five months of intensive training at Scott Field, the outfit was sent overseas. Instead of being assigned to active duty, it was given another long period of intensive training over the landscape of England.

During this period, the members of the 11th became restless and anxious to see some results of the training they had been receiving for so long a time. Privates Hal Green and Laurence Larson conceived the idea of Jiggs for the Squadron insignia, and it was given favorable consideration for two reasons. In the first place, the restraining hand of the A.E.F. officialdom was as much upon them as "Maggie's" indomitable will was upon "Jiggs." They couldn't go places and do things when the urge came any more than "Jiggs" could.

The attitude of the members of the 11th Aero Squadron is officially preserved for posterity on a "Souvenir de Guetre" showing "Jiggs" when he became the Squadron insignia. The inscription reads: "Mr. Jiggs, borne in the mud of Maulan at the start of the Argonne offensive, whose omnipresent smile seems to exemplify the indomitable spirit of the 11th Squadron despite rebuffs and disappointment in its efforts to get into the fray. Originated by Privates Hal Green and Laurence Larson, painted by Sergeant Clement Jenkins."

The unofficial records show that "Jiggs" accompanied the Squadron on thirty-two bombing raids, engaged in seventeen combats, and has official confirmation of thirteen victories.

Battle Credits: Defensive Sector - September 6/11. 1918. Lorraine. St. Mihiel Offensive - September 12/16, 1918. St. Mihiel.

Defensive Sector - September 17/25, 1918. Lorraine.

Meuse Argonne Offensive - September 26, November 11, 1918.

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SPRING HAS NOT YET "CAME."

Touching on the encampment of the Headquarters and Headquarters Squadron, 8th Pursuit Group, GHQ Air Force, the scribe of that organization has this to say:

"In camp at Virginia Beach, Virginia, April 13, 1937. Great shades of Boreas, but it was cold last night!!!! B-r-r-r-r! Sergeant Boudreaux's 'Sibley' got to acting up, and this morning he was heard to remark that 'he knew just how a Virginia ham felt.' Very little sleep was had by anyone in camp last night, but a substantial breakfast of scrambled eggs, bacon, toast, coffee, fresh milk and grapefruit, served by mess Sergeant Biggers of the 35th Pursuit Squadron, put everyone in a good humor this morning. Of course, the warm sunshine helped, too. If the weather man will only be kind, one and all are prepared to enjoy camp life for the next two weeks."

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Effective April 30, 1937, Captain Cornelius J. Kenney, Air Corps, goes on the retired list for disability incident to the service.

V-7305, A.C.

B I O G R A P H I E S

LIEUT. COLONEL THOMAS J. HANLEY

Lieut. Colonel Thomas J. Hanley, Air Corps, now on duty at Mitchel Field, L.I., New York, as Commanding Officer of Base Headquarters and 2nd Air Base Squadron, was born at Coshocton, Ohio, March 29, 1893. He attended the public schools and high schools of Coshocton, and graduated from the U.S. Military Academy on June 12, 1915. Appointed a second lieutenant and assigned to the 23rd Infantry, he served with his regiment at Texas City, Texas, from September 12 to 20, 1915; was on detached service at Jacksonville, Fla., in connection with the National Rifle matches to December 3, 1915; and on duty with his regiment at Galveston, Texas, to March 10, 1916, and at El Paso, Texas, to August 7, 1916. He was then attached to the Aviation Section, Signal Corps, to undergo flying training at the Signal Corps Aviation School at San Diego, Calif. Upon the completion of his training he was, on April 8, 1917, assigned to duty with the 1st Aero Squadron at Columbus, New Mexico. A month later, he was transferred to Kelly Field, Texas, where he was on duty with the 5th and 19th Aero Squadrons to July 10, 1917, when he was transferred to Chanute Field, Rantoul, Ill., where he served as Officer in Charge of Flying to August 27, 1917, and Commanding Officer of the 38th Aero Squadron to January 2, 1918. He was Assistant Officer in Charge of Flying at Rich Field, Waco, Texas, to February 23, 1918; Commanding Officer of the 274th Aero Squadron at Taliaferro Field, Texas, to March 16, 1918; Engineering Officer of the post to May 10th, and Commanding Officer from March 25th to April 9th.

Colonel Hanley's next assignment was at Carruthers Field, Fort Worth, Texas, where he was Commanding Officer from May 10 to October 21, 1918; Executive Officer to November 11, 1918, and Officer in Charge of Training to January 4, 1919. From January 8 to February 27, 1919, he took an advanced course in Pursuit flying at Rockwell Field, Calif., and then returned to Carruthers Field and was in command thereat until December 18, 1919.

Transferred to Langley Field, Va., he served as Executive Officer from January 6 to June 5, 1920; Commanding Officer of the 1st Army Observation Group to August 25, 1920, and performed the duties of Summary Court Officer and Surveying Officer in addition.

Ordered to Post Field, Fort Sill, Okla., Colonel Hanley organized a detachment of the 135th Squadron, and then proceeded with this unit to Fort Leavenworth, Kans. and was in command of it at that station until November 6, 1920. He then proceeded to Langley Field and was assigned to duty at the Field Officers School (later the Tactical School) as Director of the Administration course and as a student as well. In May, 1921, he commanded the 2nd Provisional Bombing Group, also the 14th Squadron, serving in the latter capacity to September 18, 1921. He commanded the 1st Provisional Bombardment Wing to September 30th, was an instructor at the Field Officers School to December 16, 1921, and was then transferred to the Philippines. Assigned to station at Kindley Field, Fort Mills, P.I., he commanded the 2nd Observation Squadron from March 7 to August 7, 1922; the Provisional Administration Company to September 22, 1922, and was then transferred to Camp Nichols and commanded this post and the Air Depot thereat to May 16, 1923. From that date until the end of his tour of duty in the Philippines, he commanded the 28th Bombardment Squadron, served as Post School Officer and Post Operations Officer and at various times was in temporary command of the post.

After commanding Crissy Field, Presidio of San Francisco, Calif., and the 91st Observation Squadron from March 7th to August 3, 1924, he was transferred to Washington, D.C., for duty as a student at the Army Industrial College. From February 2, 1925, to August 22, 1928, he was on duty in the Office of the Assistant Secretary of War.

Upon completing a two-year course of instruction at the Command and General Staff School at Fort Leavenworth, Kansas, Colonel Hanley's next assignment was at Kelly Field, Texas, where he was Executive Officer of the Advanced Flying School and the 10th School Group to August 7, 1930; Assistant Commandant of this school to October 22, 1931, and at various times was in temporary command thereof. He was transferred to the Primary Flying School at Randolph Field and served as Executive Officer and Assistant Commandant to June 1, 1932.

For the next four years, Colonel Hanley was on duty as instructor at the Command and General Staff School at Fort Leavenworth, Kansas. Upon his relief from duty at Fort Leavenworth, he was assigned to his present duties at Mitchel Field.

Colonel Hanley was promoted to 1st Lieut., July 1, 1916; to Captain, May 15, 1917; to Major, May 24, 1925; and to Lieut. Colonel, December 1, 1936. He held the temporary rank of Major from July 10, 1918, to March 1, 1920, and that of Lieut. Colonel from August 25, 1918, to October 17, 1918, and from June 16 to December 1, 1936. He is on the General Staff Corps eligible list.

V-7325, A.C.

LIEUT. COLONEL ADLAI H. GILKESON

Lieut. Colonel Adlai H. Gilkeson, Air Corps, now on duty at Langley Field, Va., as Commanding Officer of the 8th Pursuit Group, GHQ Air Force, was born at Lansdale, Pa., January 25, 1893. He attended public schools and high school at Sellersville, Pa., and after graduating from the U.S. Military Academy, West Point, N.Y., June 12, 1915, was appointed a second lieutenant and assigned to the 11th Infantry, with which he served at Douglas, Arizona, September 12, 1915, to September 10, 1916.

Attached to the Aviation Section, Signal Corps, Colonel Gilkeson, after completing his flying training at the Signal Corps Aviation School, San Diego, Calif., was assigned on May 19, 1917, to the 1st Aero Squadron at Columbus, New Mexico. He received the rating of Junior military Aviator June 20, 1917. From July 7 to September 24, 1917, he was Commandant of the School of Military Aeronautics, Princeton University, and from September 28, 1917, to January 5, 1918, he was on duty at Chanute Field, Rantoul, Ill. After serving as Engineer Officer at Rich Field, Waco, Texas, to April 5, 1918, and as Officer in Charge of Flying at Wilbur Wright Field, Fairfield, Ohio, to August 17, 1918, he returned to Chanute Field and was stationed there until January 16, 1919.

Transferred to Aberdeen Proving Ground, Md., Colonel Gilkeson commanded the 217th Aero Squadron there to April 3, 1919. He was on duty at Hazelhurst Field, Mineola, L.I., New York, to October 1, 1919; with the 60th Infantry at Camp Gordon, Ga., to August 25, 1920; Executive Officer at Carlstrom Field, Arcadia, Fla., to July 1, 1921; and, prior to sailing for duty in the Philippines, served a little over a month at Crissy Field, Calif.

After completing a two-year tour of duty in the Philippines as commanding officer of Clark Field and the 3rd Pursuit Squadron, he was assigned to duty as Professor of Military Science and Tactics at the Massachusetts Institute of Technology, Cambridge, Mass. Upon his relief from duty at the M.I.T., Colonel Gilkeson was a student at the Chemical Warfare School, Edgewood Arsenal, Md., September 14 to November 21, 1925, and thereafter, until June 8, 1928, he remained on duty at this station as Air Corps Liaison Officer.

From June 27, 1928, to July 2, 1929, he was a student at the Air Corps Engineering School at Wright Field, Dayton, Ohio. Thereafter, until September 1, 1931, he was Chief of the Equipment Branch of the Air Corps Materiel Division, Wright Field. Following his graduation from the one-year course at the Air Corps Tactical School, Maxwell Field, Ala., June 10, 1932, Colonel Gilkeson was assigned to duty with the 1st Pursuit Group at Selfridge Field, Mich., as Executive Officer and Officer in Charge of Flying. While assigned to this station, he was on duty with the Civilian Conservation Corps for 13 months.

From November 22, 1934, to March 3, 1935, Colonel Gilkeson was on duty at Fort Sam Houston, Texas, with the Organized Reserves, 8th Corps Area. Since March 6, 1935, he has been on duty with the GHQ Air Force at Langley Field, Va.

Colonel Gilkeson, during February, 1936, commanded the provisional group which was engaged in conducting cold weather tests of clothing and equipment in the New England area.

Colonel Gilkeson can probably lay claim to making the lowest emergency parachute jump on record. On October 5, 1927, when he was stationed at Edgewood Arsenal, Md., he was testing a Pursuit plane to determine the glide necessary to attain a speed of 200 miles an hour. When 50 feet from the ground, a loud crash, followed by a severe jolt which jerked the plane about 45 degrees to the right, was noted. A cloud of gas, oil and water enveloped the ship as it shot up in the air to about 150 feet, rolled to the right and then started down. At 100 feet Colonel Gilkeson left the ship by parachute when the plane rolled completely over, its inverted position aiding him to a very great extent in leaving it and saving seconds which were precious. The opening of the parachute was followed almost immediately by his landing on the ground, and he had no time to realize any other sensations other than that the ground was coming up too fast and that he was too close to the falling plane.

Colonel Gilkeson was promoted to 1st Lieutenant on July 1, 1916; to Captain, May 15, 1917; to Major, July 18, 1925; and to Lieut. Colonel, December 24, 1936.

He held the temporary rank of Major from August 15, 1918, to February 25, 1920, and that of Lieut. Colonel, from March 2, 1935, to December 24, 1936. His total flying time exceeds 4,000 hours.

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Commendation for 8th Attack Squadron

(Continued from Page 8)

ed his duties well and that such a commendation goes far towards raising morale by recognition of the effort put forth."

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The 37th Attack Squadron, GHQ Air Force, Langley Field, Va., recently received and installed the new chemical tanks for its A-17 Attack planes. During the middle of April, according to plans previously made, the Squadron was scheduled to demonstrate its efficiency with chemicals and fixed guns before the Chemical Warfare Classes at Edgewood Arsenal, Md.

AUTOMOBILE COMFORT IN AN AIRPLANE

A new type of cockpit that certainly should please all Air Corps pilots is being evolved. At present, this new arrangement exists on paper only, but soon a mock-up will be built and placed in the Operations Office at Bolling Field, where all resident and visiting pilots will be invited to take a try at it and to jot down their comments for further use of the designers.

Its principal feature is the new padded seat, built on the general lines of the old seat, but with a back several inches higher and a seat considerably longer, which will certainly be less trying to the pilot's legs and back. Parts of both the back and seat cushions, corresponding in size and shape to the size and shape of the back and seat pack parachutes, are removable. The seat slides backward and forward on an 8-inch track, and can be locked in any one of sixteen different positions (the pin holes being only ⅛ inch apart), thus permitting the pilot to choose the most comfortable distance from both stick and rudder. The up and down adjustment of the old seat is retained, and the back remains tilted at 13⅜ degrees but, by means of a lever on the left side, the seat itself may be tilted upward two inches when desired. A new type of safety belt, the shoulder type, is being tested on this seat. Its principal advantage is that, normally, it may be worn loosely enough to give the pilot free forward movement, but, if a crash is imminent, it may be instantly tightened to hold the pilot securely against the cushioned back.

Entrance to this new cockpit will be possible from either side through doors operating in the same manner as the doors of an automobile. For emergency exit with a parachute, it will be possible to release the hinge pins, thus allowing the door to fall and give the pilot a maximum freedom of exit. Besides, as a final safety measure, if for some reason these pins should jam, a means is provided for opening an exit above the pilot.

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Commendation for Advanced Flying School

(Continued from Page 6).

cellent planning, supervision, and execution of this flight by all concerned."

This flight was the Student Maintenance Navigation Flight for the student class at the Air Corps Advanced Flying School which graduated on February 17, 1937. The itinerary of the flight included stops at five universities, namely, the University of Alabama, Alabama Polytechnic Institute, Georgia School of Technology, University of Georgia, and the Louisiana State University. Students of these schools evinced considerable interest in aviation.

NIGHT ATTACK MISSIONS BY 3RD ATTACK GROUP

The peaceful charm of early evening at Barksdale Field, Shreveport, La., has been considerably disturbed during recent weeks. The Third Attack Group has been completing its training schedule. Householders watering lawns and others communing with nature on various parts of the reservation have been startled by element after element passing low across the flying field and firing into the range to the east, returning later to drop parachute bombs and spray limewater along the same route. Blazing parachute flares, the staccato crack of machine gun fire, and the sudden appearance of white lime water spray and parachute bombs in the wake of attacking elements have provided something of a spectacle.

Not so apparent is the careful planning and training necessary to allow two separate squadrons to operate against one target at night. The difficulty of handling an airplane and three weapons in low altitude formation in the dark, and the eyestrain involved in trying to locate a target from a low altitude in the black distance early enough to maneuver a squadron into the exact time and angle of approach may well be appreciated. While it was not feasible to score the machine gun firing, it was possible to measure the disposition of the bombs and spray. A surprising degree of accuracy was achieved with these weapons.

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AERIAL PHOTOGRAPHS OF CONCHOS DAM

Pursuant to War Department orders, 1st Lieut. Charles F. Densford and Staff Sergeant Herman L. Chestnutt, of the 22nd Photo Section, Kelly Field, San Antonio, Texas, took off by air on April 15th for the purpose of obtaining aerial photographs of construction progress on the Conchos Dam project in New Mexico. Lieut. Densford's orders required him to contact the District Engineer, U.S. Engineer Office, Conchas Dam, in regard to details and arrangements for taking the photographs.

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In recognition of his research and experimental work in blind landing systems, Private Edward M. Sorenson, of the Headquarters and Headquarters Squadron, 20th Pursuit Group, Barksdale Field, La., was transferred to the Air Corps Material Division, Wright Field, Dayton, Ohio, to continue his work on the subject.

The two systems as devised by Private Sorenson have held up extremely well in the basic analysis, and it is expected that he will build experimental models of his apparatus and conduct tests at Wright Field. Details of his systems are not ready for publication at the present writing.

V-7325, A.C.

AERIAL GUNNERY BY THE 20TH PURSUIT GROUP
By the News Letter Correspondent

The 20th Pursuit Group, Barksdale Field, La., engaged in high altitude aerial gunnery practice at Fort Crockett, Galveston, Texas, between the dates of March 24th and April 20th, 1937. A permanent camp was established on the airdrome at Fort Crockett, and operations were conducted by successive squadrons working individually.

The 77th Pursuit Squadron, under the command of Major Carlton F. Bond, Air Corps, opened the camp under most unfavorable weather conditions and was considerably handicapped at the outset of operations. "Unusual" spring weather, including fog, rain and extreme cold, forced the grounding of all planes for the most part of the first week. Considerable damage was dealt the camp on the first night after its establishment by a severe wind and rain storm. The cold which followed made Sibley heaters a welcome addition to all tents.

Operations in night gunnery were carried on with the assistance of an A-17 airplane acting as target and the Coast Artillery anti-aircraft playing searchlights upon it. Flying at night was done from the Galveston Municipal Airport because of the small size and inadequate lighting facilities at the Fort Crockett Airdrome.

The 77th Squadron was followed in order by the 55th and 79th Pursuit Squadrons, with Captain ..R. Nelson and Major Frank O'D. Hunter, respectively, in command.

An innovation into the schedule was supplied by the 55th Squadron, which fired .50 caliber guns at the towed sleeve. This was the first .50 caliber aerial gunnery to be attempted in the 20th Pursuit Group. For the accomplishment of this mission, the usual 600-foot tow rope was lengthened to 1,000 feet, and the firing was done from a distance of 500 feet. Tragedy overtook the 55th Squadron encampment when, on April 7th, Lieut. A.E. Livingston, Air Reserve, dived into the Gulf of Mexico from 6,000 feet and was killed. He was towing a target at the time of the accident.

The 79th Squadron entered the camp on April 13th and, upon completion of their firing, closed the camp and returned to Barksdale Field on April 20th.

Thirty caliber firing was carried on at altitudes of 5,000, 10,000 and 15,000 feet both by individual airplanes and elements. Stress was laid on similating actual combat conditions rather than upon attempting to make high scores throughout the training schedule. A decided difference was noted in handling of the ships and in firing at high altitudes when compared with the normal firing down at 5,000 feet.

During the night operations, guns were not loaded, and attacks were made upon an A-17 airplane instead of upon the towed sleeve. The Coast Artillery played powerful searchlights on the target while attacks were made by elements, care being taken to keep the attacking ships out of the glare of the lights to prevent involuntary blindness. All squadrons participated in .30 caliber firing and in night gunnery operations, and the 55th Squadron fired, in addition, a number of missions with .50 caliber. A modified form of standard tow rack was used throughout, thus enabling the tow rope to be doubled on take-off and increasing the efficiency of tow ship operation from a small field.

A modified rack was designed and reworked by the 55th Squadron armament section, under direct command of 2nd Lieut. William Eades, Air Reserve. The rack has since been flown to Wright Field by Lieut. Eades and demonstrated before the Equipment Branch of the Materiel Division, after which tests it was given an O.K. for use.

All racks in the 20th Pursuit Group are at present modified to allow for the new manner of take-off. The basic principle of the system is in having the catches on the rack itself changed to hold the target release. By doing this, the tow ship can be taken off with the rope doubled, cutting the length down to 300 feet and making for a quicker, safer take-off. After the ship is in the air, the first pull on the release handle drops both trailing end of tow rope and the first target. Thereafter, additional targets are released as needed in the prescribed manner. In all tests and in operations of the modified rack, the functioning has been almost 100% perfect.

Tests were also run in the 55th Squadron, using a 1500-foot tow rope in preparation for .50 caliber firing, but this proved unsatisfactory. Better results may be obtained with a type of tow ship other than the P-26A or when some form of reel for the tow rope is devised.

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Special orders of the War Department, recently issued, assign the following-named Air Corps officers to duty at the stations indicated upon the completion of their present tour of service in the Hawaiian Department, viz:

Lieut. Colonel John C. McDonnell to Barksdale Field, La.

First Lieuts. Donald D. Arnold and Kingston E. Tibbetts to Mitchel Field, N.Y.

First Lieut. James E. Briggs to Selfridge Field, Mich.

First Lieut. Robert E.L. Pirtle to Hamilton Field, Calif.

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Contribution of material for the News Letter from Wheeler and Mitchel Fields is solicited.

R E T I R E M E N T S

April 30, 1937, marked the date of the termination of the active military service of two Army Air Corps pilots, Captains Cornelius J. Kenney and Mark R. Woodward, who were placed on the retired list for disability incident to the service.

Captain Kenney was born on November 12, 1897, at Brookline, Mass. He graduated in 1916 from the Mechanic Art High School of Boston, Mass. Enlisting on October 23, 1917, as a Private, 1st Class, Aviation Section, Signal Reserve Corps, he was called to active duty at the School of Military Aeronautics, Massachusetts Institute of Technology, Cambridge, Mass., on December 1, 1917. On January 7,1918, he was transferred to the School of Military Aeronautics, Princeton University, from which he graduated February 23,1918, and was then sent to Camp Dick, Dallas, Texas, for duty with a squadron. On March 13, 1918, he was transferred to Taliaferro Field, Hicks, Texas, for flying training, which he completed April 25, 1918. He was commissioned a 2nd Lieutenant, Aviation Section, Signal Reserve Corps, June 5, 1918, and assigned to active duty. On June 11th, he returned to Camp Dick for further flying training and instruction in aerial gunnery, and on July 25th he was transferred to Payne Field, West Point,Miss., for flying duty, embracing acrobatics, cross-country flying and formation flying.

On October 1, 1918, Captain Kenney was ordered to the Aviation Concentration Depot at Garden City, Long Island, N.Y., in preparation for overseas service, but with the Armistice being signed before he sailed, he was transferred on December 13, 1918, to Rockwell Field, San Diego, Calif., where he completed a course in aerial gunnery and Pursuit flying.

Transferred to Kelly Field, Texas, on July 22, 1919, he served at that station until February 17, 1922, in the capacities of Engineer Officer, 12th Aero Squadron, for 13 months, and then with the 96th Bombardment Squadron as Radio and Armament Officer, Adjutant, and Post Utilities Officer. From February 24, 1922, to April 22, 1922, he was stationed at Mitchel Field, L.I., New York, as Adjutant, 7th Air Park. He was then transferred to the Panama Canal Department, serving on the Isthmus for a period of three years in the capacities of Adjutant, 25th Bombardment Squadron, for 13 months; Assistant Post Communications Officer, 2 months; Engineer Officer, 24th Pursuit Squadron, 5 months, and Supply Officer, two years.

On May 1, 1925, Captain Kenney reported for duty at Post Field, Fort Sill, Okla., where he served as Supply Officer of the 44th Observation Squadron for five months; Engineer Officer for two years, and Operations Officer for Air Service troops for a similar period.

From June 21, 1927, to July 24,1929, he served at March Field, Riverside, Calif., as Commanding Officer of the 24th Observation Squadron.

In July, 1929, Captain Kenney was assigned to duty in New York City as Executive Officer, Non-Divisional Units, Second Corps Area, a position he occupied, with subsequent changes of station to Governors Island, N.Y., and Mitchel Field, N.Y., to August 30, 1933, when he was transferred to the Air Corps Tactical School, Maxwell Field, Ala., for duty as student. Following his graduation in June, 1934, he was assigned to Selfridge Field, Mich., where he served as Supply Officer, 1st Pursuit Group Headquarters, and later as Commanding Officer of the 57th Service Squadron.

Captain Kenney was commissioned in the Air Service, Regular Army, as a second lieutenant, on July 1, 1920, and was promoted to 1st Lieutenant the same date, and to Captain, February 1, 1933. From April 20, 1935, to January 22, 1936, and from August 26, 1936, until recently, he held the temporary rank of Major.

Captain Mark R. Woodward, Air Corps, who since June, 1935, served as Commandant of Cadets and Director of Ground Training at the Advanced Flying School, Kelly Field, Texas, was born January 10, 1895, at Rosehill, Va. After graduating in 1914 from San Angelo, Texas, high school, he attended the University of Virginia for two years.

Enlisting as a Private, 1st Class, Aviation Section, Signal Enlisted Reserve Corps, in June, 1917, he received his ground school training at the Ohio State University and his flying training at Ellington Field, Houston, Texas. Passing the required tests for the rating of Reserve Military Aviator, he was, on April 20, 1918, commissioned a 2nd Lieutenant, Aviation Section, Signal Reserve Corps, and assigned to active duty at Ellington Field.

Following brief periods of service at Camp Dick and Love Field, both at Dallas, Texas, Captain Woodward was transferred, on June 1, 1918, to Payne Field, West Point, Miss.,where he served as Personnel Adjutant, in addition to other duties, until February, 1919. For the next five months he was stationed at the Primary Flying School, Carlstrom Field, Arcadia, Fla., performing among various other duties those of Assistant Engineering Officer.

From June, 1919, to March, 1920, Captain Woodward was stationed at Mitchel

Field, L.I., New York, where he served as Personnel Adjutant of the post, also as Adjutant of the 15th Aero Squadron.

At Mather Field, Sacramento, Calif., to which Captain Woodward was assigned in March, 1920, he performed various duties at different times, including those of Adjutant of the 9th Aero Squadron, Personnel Adjutant of the post, Commanding Officer of the 28th Bombardment Squadron and Commanding Officer of the Air Service Supply Detachment. He participated as pilot in Forest Fire Patrol operations. From August, 1922, he served on a two-year tour of duty in the Philippines, being stationed at Clark Field in the capacity of adjutant. For three years thereafter, until June, 1927, he was on duty as Assistant Professor of Military Science and Tactics at the Massachusetts Institute of Technology, Cambridge, Mass.

Captain Woodward's next station assignment was at Aberdeen Proving Ground, Md., where he performed various duties, including those of Adjutant of the 49th Bombardment Squadron; Operations Officer, Engineering Officer and Acting Air Officer of the 3rd Corps Area.

Transferred in March, 1932, to Langley Field, Va., he served at this post in such capacities as Commanding Officer of the 2nd Bombardment Group Headquarters; Adjutant, 2nd Bombardment Group; and staff duties at post headquarters until his transfer to Kelly Field, Texas.

Captain Woodward was commissioned in the Air Service, Regular Army, on July 1, 1920. He was promoted to 1st Lieutenant on the same date, and to Captain, March 1, 1932. He held the temporary rank of Major from July 18, 1935, to January 25, 1937. He will make his home at Bergs Mill, Texas.

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ARMY DAY AT HAMILTON FIELD

During the first week in April, the 7th Bombardment Group, Hamilton Field, Calif., participated in quite a number of flights. Cooperating with civilian authorities, flights were made over San Francisco, Oakland, and several cities in the Bay Area. On April 6th, the Air Base was thrown open to the public in an "Open House" celebration and featuring exhibitions of formation flying, gunnery and bombing missions. On the ground were exhibits showing the great number of activities so necessary in maintaining a fighting unit.

The photographic laboratory of the 88th Reconnaissance Squadron set up a most attractive display and proved to be the center of attraction. A Martin B-10B was on display with all or most of its flying equipment. Ships of many types were much in evidence, one of which was the new Douglas B-18. This ship was the object of much discussion by the men of this Air Base, late reports indicating that this base will maintain several of these ships in the near future.

The celebration ended with quite the most thrilling events of the day. Parachute jumps featuring 1st Lieut. Carl A. Brandt, 2nd Lieut. James A. Philpott, Privates, 1st Class, Sam Goldbaum, Charley H. Chan and James R. Wright, made a grand finale to a perfect day.

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BOMBARDIER'S KIT

Experience in the 9th Bombardment Squadron has demonstrated the necessity of a bombardier's kit in order to facilitate the bombardier's problem by providing an orderly and efficient means of handling the numerous charts, the record sheets, and other equipment used in bombing.

A design was prepared by Lieut. J.E. Shuck, of the 9th Bombardment Squadron, Hamilton Field, Calif., and calls for a rectangular kit made of olive drab cotton duck material, approximately 10" x 15" x 1-3/4". On the front side of the kit there is a pocket with an elastic top sized to hold the altitude correction computer, a pocket to hold the tachometer, a pocket for two pencils, and a pocket for a small thumb tack board. The rear side of the kit has two celluloid windows with pocket backing made to hold bombing data charts.

The inside of the kit is divided into two sections, one to hold the plotting board and the other for spare plotting sheets. A flap, with a snap fastener, folds over the top of the kit closing the opening at the top. A carrying strap is provided with a snap on one side so as to provide a means of hanging the kit in the airplane.

The need for such a kit was recognized, and the design prepared by the 9th Squadron was so satisfactory that the Commanding Officer of the 7th Bombardment Group ordered sufficient kits to equip all squadrons of that Group.

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The 33rd Pursuit Squadron, Langley Field, Va., is keeping busy these trying days of 2nd Wing Field Exercises. "Interception missions, aerial and ground gunnery, cadet training and training of rear seat gunners leaves us very little time off," says the News Letter Correspondent, who adds: "The four cadets of the 33rd Squadron have been assigned as assistants to the various squadron jobs. The new pilots just finishing the Flying School are always eager and willing to cooperate and perform any job given them."

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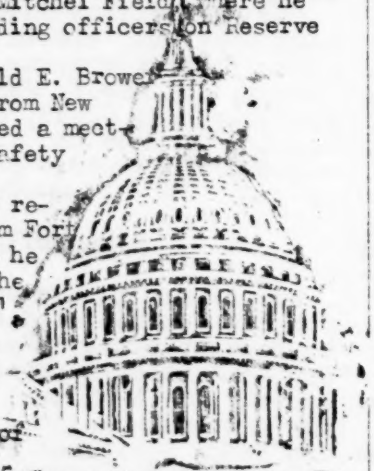
Upon the completion of his tour of duty in the Hawaiian Department, Lieut. Col. Hume Peabody, Air Corps, is ordered to Maxwell Field, Ala., for duty as a member of the Air Corps Board.

WASHINGTON OFFICE NOTES

Lieut. Colonel Robert L. Walsh returned April 17th from Boston and Mitchel Field, where he conferred with commanding officers on Reserve matters.



Lieut. Colonel Gerald E. Brower returned April 15th from New York, where he attended a meeting of the National Safety Council.

Major A.W. Marriner returned April 13th from Fort Monmouth, N.J., where he delivered a talk to the students of the Signal School.

Colonel Rush B. Lincoln and Major Wm. B. Souza departed on April 27th on leaves of absence.

Colonel Chalmers G. Hall, Chief of the Supply Division, returned April 24th from a cross-country trip to Buffalo, N.Y.

Officers from other stations who reported to the Chief's Office for temporary duty were Major Austin W. Martenstein, from Maxwell Field, on April 20th, and 1st Lieut. Hollingsworth F. Gregory, from Fort Sill, Okla., on April 23rd.

Colonel Frank D. Lackland, Chief of the Field Service Section, Materiel Division, Wright Field, Ohio, visited the office April 21st while on leave of absence.

Colonel Wm. C. McChord, Chief of the Training and Operations Division, left for Mitchel Field on April 22nd for a conference.

Majors Malcolm C. Grow and Lowell H. Smith returned from extended inspection trips.

Majors Arthur E. Easterbrook, Alfred W. Marriner and James A. Mollison left April 21st on an inspection trip.

Major Karl S. Axtater departed April 23rd on leave of absence.

Major Morton H. McKinnon left April 27th for temporary duty at Dayton, Ohio.

Captain James B. Jordan, Supply Division, returned April 15th from Chicago, where he visited the Procurement Planning Office.

First Lieut. George W. Hansen, Maxwell Field, Ala., visited the OCAC on April 22nd while on leave of absence.

Captain Pardoe Martin, in charge of Reserve activities at the Municipal Airport, Long Beach, Calif., and who not so long ago was on duty in the Personnel Division, OCAC, dropped in during the course of an extended navigation flight from the West Coast to confer on Reserve matters and to shake hands with old friends. He was accompanied by Captain Miller B. Towman, Air Reserve.

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WAR DEPARTMENT ORDERS

CHANGES OF STATION: To Langley Field, Va.: 1st Lieuts. John A. Feagin and John A. Samford from Panama Canal Department - 1st Lieut. Frank H. Robinson, upon completion present course of instruction, Air Corps Technical School, Chanute Field, Ill. (Previous orders amended) - Captain James M. Fitzmaurice from Kelly Field - Captains Darr H. Alkire, Carl B. McDaniel, 1st Lieut. Ivan M. Palmer, from Randolph Field, Texas - Major William C. Goldsborough (Captain), previous orders amended in his case - 1st Lieut. William H. McArthur, from Panama - 1st Lieut. Thomas L. Thurlow, from Wright Field.

To Selfridge Field, Mich.: Lieut. Colonel Laurence F. Stone (Major). Previous orders in his case amended. - Major Louis N. Eller (Captain) from Kelly Field.

To Office Chief of the Air Corps, Washington, D.C.: Major Ira C. Eaker, upon completion of present course of instruction at the Command and General Staff School, Fort Leavenworth, Kansas - Captain David G. Lingle, upon completion of present course of instruction at Air Corps Tactical School, Maxwell Field, Ala.

To Panama Canal Department: 1st Lieut. Edward H. Underhill and 2nd Lieut. William T. Hudnell, Jr., upon completion of present course of instruction at Air Corps Technical School, Chanute Field, Ill. - 1st Lieut. Morris J. Lee, from A.C. Technical School. - 1st Lieut. Robert K. Taylor, from A.C. Technical School.

To March Field, Calif.: Major Grandison Gardner (Captain) from duty as Instructor at A.C. Tactical School, Maxwell Field, Ala.

To the Philippine Department: Major Earle J. Carpenter (Captain) from Mitchel Field.

To Mitchel Field, N.Y.: Major Robert H. Finley, from Moffett Field, Calif.

To Randolph Field, Texas: 1st Lieut. Charles A. Clark, Jr., from Philippines.

To Hawaiian Department: 2nd Lieut. Wm. F. Frutchey, upon completion present course of instruction A.C. Technical School, Chanute Field, Ill.

To Wright Field, Dayton, O.: 1st Lieuts. Charles K. Moore and Edwin S. Parrin, students, upon completion of their present course of instruction, former at California Institute of Technology, Pasadena, and the latter at the University of Michigan.

The following-named Air Corps officers, upon completion of their present course of instruction at the Air Corps Tactical School, Maxwell Field, Ala., are assigned to stations as follows: Major Robert V. Ignico (Captain) to Mitchel Field; 1st Lieut. George McCoy, Jr., to Selfridge Field; Major William W. Welsh (Captain) to Maxwell Field; Major Frank D. Hackett (Captain) and 1st Lieut. Russell A. Wilson to March Field, Calif., and Captain David M. Schlatter to Fort Knox, Ky., for duty with the 12th Observation Squadron.

Upon the completion of their present course of instruction at the Air Corps Engineering School, Wright Field, Ohio, the following-named Air Corps officers are assigned to the Materiel Division for duty: Captains Raymond E. Culbertson, John G. Moore, 1st Lieuts. Eugene H. Beebe, Howard G. Bunker, Louis E. Massie and Herbert H. Tellman.

Major Harvey W. Prosser (Captain), Air Corps, now stationed in the Philippines, has been detailed with the Department of Commerce for one year in the Philippines in connection with the work of promoting civil aviation.

SCIENCE AND NATIONAL AIR DEFENSE
Address by General Oscar Westover, Chief of the Air Corps,
Before Greater New York Chapter of the National Aeronautic Association
Radio City, New York, April 23, 1937

WILLIAM Stanley Jevons, eminent English logician, once stated "Science teaches us to know, and an art to do, and all the more perfect sciences lead to the creation of corresponding useful arts." Thus has science entered into the develcpment of the airplane as a weapon in National Defense, through the exhaustive research of our engineers the tools have been provided for the practice of the art of Air Defense. As rapid and amazing as this development has been, the life of the aeronautical scientist has not been what might be called a "bed of roses." Apropos of the trials and tribulations of the designers of military aircraft, also the rapidity with which aircraft design has changed, I will quote a poem by one of them entitled "An Engineer's Nightmare."

Home from his toil, an engineer
Sank wearily to bed;
The plans of wings and landing gears
Were buzzing through his head.

Then there appeared before his eyes
A dreadful apparition
Much like the ancient mariner
In very poor condition.

Who laid upon the bed a tome
Of 40 thousand pages.
"Specifications" it was marked,
And showed the wear of ages.

He frowned a military frown,
His eyes began to glisten,
And pointing with his horny hand
He throatily croaked, 'Listen!"

Design for us, O-Engineer,
An airplane that is hot;
A two-place Fighter's what we want,
The best that can be got.

Of course, you should be quite prepared,
Like any good go-getter,
To change it quickly to a bomber
If we decide that's better.

Now don't forget - it must be fast,
Three hundred's not enough;
But it must land at 20 miles
As light as downy fluff.

Remember, too, it must be dived
Or "Dove" - or is it "diven?"
No matter - it must go like Hell
Nor land the crew in Hivven.

A clean design, for speed's sweet sake,
That's a necessity.
The wings, of course, must fold, but please
Not unexpectedly.

The wings need flaps, the cowl does, too,
The ailerons must droop;
And seaplane floats would be right nice
For landing in the soup.

Since no one knows if this design
Will base on beach or boat,
Arrange to have the wheels retract
Into the seaplane float.

Put in some gas, enough to fly
From Hindoostan to here;
A crew of two - a radioo
And add Floatation gear.

A battery of ten-inch guns -
No wait - that's Battleships.
Oh, well, you'd better put them in;
We'll leave them out on trips.

The radio will be - let's see -
This one - no that one - wait,
Leave room for both - We'll pick one out
At some much later date.

That's all - except of course for bombs
And Cameras and Mappin',
Torpedoes, too, and smoke-screen tanks -
No telling what may happen.

Let's see - The last one was how strong?
Now multiply by three.
One never knows, does one, when one
Will strain it mightily.

Now hark ye well, 'tis writ in blood
That you'll be in a kittle
If you should deviate from specs
One single jot or tittle.

Each part must be well anodized,
Ten coats of paint you'll give it;
And bonding wire must connect
Each bolt and nut and rivet.

So there you are - Now go ahead
And dash off this design.
Ten weeks we'll give you - not enough?
We'll compromise on nine.

Because, you see, 'Twill take us years
To carefully peruse it
And fully satisfy ourselves
We simply cannot use it.

With few exceptions, every science enters either directly or indirectly into the fabrication or employment of this modern vehicle of defense and, in order that there may be continued improvement in the safety, efficiency, range, speed and capacity of aircraft, our national aviation policy should provide for the comprehensive planning and execution of long range programs of fundamental scientific research.

There are those who believe that science, by aiding in the development of such implements of war as the airplane, is promoting war. Such might be true in the case of an aggressor nation, but in this country which, simultaneously with its inception, adopted the policy of defense only, the more perfect our weapons are for defense the less apt we will be required to

use them; so that science instead of promoting war actually holds the key to the ultimate solution of the problem of peace. It requires a long range view to believe that statement, for as we look around the world today we find many peoples, who by their enormous rearmament programs with especial emphasis on the airplane, indicate that they believe war is probable if not inevitable, and with the rapid extension of science and agencies of destruction, the possible extent, risk and result of such a war will probably be vastly greater than any ever experienced before. But those nations are aggressors which we are not, so who can say, under the condition of strained international relations existing today, that the efforts of our scientists should not be devoted to perfecting our instruments of defense to the point of impregnability and thus keep us out of such a war.

The next war, if and when it comes, will not be between armies but between peoples. Victory may not necessarily go to the strong but to the ingenious - the successful scientist. The decisive factor, due to the efforts of our scientists, may not be any one of those existing today but something as unexpected as were horses to the Aztecs or muskets to the Indians.

The same qualities which have made us successful in industry and commerce will give us the advantage in defense against an aggressor. Our resourcefulness may be even more effective than our resources. The result of any conflict in which we are forced to participate may depend more upon engineer and inventor than upon strategist or soldier. That Germany was able to hold out so long against encircling armies was due less to Hindenburg than to Haber, who discovered how to extract nitrogen for explosives from the air that drifted across No Man's Land.

So that we can rightly say that the development of our modern aircraft and its use in National Defense demands that the blood of the aviator be mingled with the grey matter of the scientist and the sweat of the brow of the man in the factories, mills, mines and fields of the nation.

With that thought in mind, we have adopted a national policy of fostering scientific experimentation in the aeronautical field in every possible way.

As stated before, practically all of the sciences enter into the fabrication and employment of the airplane in National Defense.

The Chemist and Metallurgist have made possible the materials without which our present day all-metal monoplanes would be impossible.

The aeronautical engineers have, by their designs, molded this material into perfectly streamlined craft that travel through the air at speeds not even dreamed of a few brief years ago.

Mechanical engineering genius, working hand in hand with the aeronautical engineer, has developed power plants, retractable landing gears, automatic controllable pitch propellers, the automatic pilot, de-icers, landing flaps, and innumerable instruments, gyroscopic and others, all of which not only add to the speeds obtainable but also make it possible for the pilot to vanquish that arch enemy of the aviator - weather. And this brings us to the meteorologist who, through his scientific research, has proven one of our humorists wrong when he said "Everybody talks about the weather but nobody does anything about it."

The uncertainty of the weather has in the past, probably more than any other one thing, caused more casualties and interfered with the scheduled operation of aircraft both military and commercial. Through years of study and research, the meteorologist has evolved what is known as the Air Mass Analysis Method of predicting weather. This has placed the forecasting of weather practically in the category with exact sciences.

With the advent of long range military and commercial aircraft, with their ability to traverse oceans as well as continents, the necessity for celestial navigation became apparent. Here astronomy, one of the oldest forms of science, enters the picture. Interwoven in the warp and woof of all these is the most exact science - mathematics.

The science of radio has now become an absolutely essential part of the operation and navigation of the airplane. The radio beacon and compass have given the airplane the characteristics of the homing pigeon. Radio is absolutely essential in the control of air traffic at all of our large air terminals.

Medical science, with all of its ramifications, enters very materially into the operation of aircraft. The selection of the necessarily physically perfect pilot personnel and the maintenance of this condition as well as the research to determine the effects of flying upon the physical and nervous condition of personnel is a function of aviation medicine.

The progress of aviation in the United States during the past twenty years, and more especially in recent years, is the envy of other progressive nations. American airplanes, engines and accessories are being sold in nearly all of the nations that use aircraft. More regularly scheduled passenger transport service is provided in the United States than in all the rest of the world combined, and more passengers are flown on American airlines than on all other airlines put together.

In the development of airplanes for Army and Navy purposes, excellent results have been achieved. Our military and naval airplanes designed to meet our service needs are not excelled. In general it may be said that the performance, efficiency, and safety of American airplanes - military, civil and commercial - are not merely abreast of foreign developments but in many cases are definitely superior. American leadership in aeronautical development is recognized abroad. This is evidenced by the purchase of American products sold in competition with foreign products, and also by the editorial comment of aeronautical authorities in leading European nations. "Imitation is the highest form of flattery." American developments have been and are being imitated abroad by many nations, including the Major European powers. Mr. C.G. Grey, editor of an English aeronautical magazine, when asked to comment on the last Paris Aviation Show, stated in effect - "I didn't know the Douglas airplane had so many illegitimate children."

When we consider the increasingly vital relationship of aircraft to National Defense, it becomes a matter of supreme concern to the Government of the United States that American aircraft excel that of any other nation. Recent feverish activities of European powers in increasing their air forces has been accompanied by great expansion of their scientific research facilities. This factor threatens seriously our present leadership and indicates the wisdom of continuing even more liberally than in the past the support of organized scientific research in aeronautics.

There are two principal agencies or groups of scientists in the United States engaged in original aeronautical research or in applying to aeronautics the product of the scientific research of the vast group of scientists in the industrial and commercial field. One of these is the National Advisory Committee for Aeronautics; the other is the Air Corps Materiel Division.

By an Act, approved March 3, 1915, the Congress of the United States established the National Advisory Committee for Aeronautics and charged it with the duty of supervising, directing and conducting scientific research and experimentation in aeronautics. The vision and wisdom of Congress in enacting that legislation and establishing the National Advisory Committee for Aeronautics as an independent scientific agency of the Government and giving it the functions, form of organization and freedom of action which it did, together with the continuous and far-sighted support of succeeding Congresses, has made possible the preeminent position of the United States in world aeronautics today. It did something for aeronautics, for the United States, and for the advancement of civilization which reflects credit on the Congress and gives us all cause to take pride.

Among the outstanding accomplishments of the human race is man's conquest of the air. It was in 1903 that the Wright Brothers made the first successful flight of an airplane at Kitty Hawk, N.C. Five years later, in 1908, the United States Government purchased its first airplane for the use of the Army and began the training of officers for military flying. During the years immediately preceding the World War, the Government and a meager aircraft industry had made important progress, but the Government, practically the only customer, had purchased less than 100 airplanes.

In the meantime, leading European nations, sensing more acutely the potentialities of aircraft in warfare, had made greater progress, and had begun laying the foundations for the new science of aeronautics; while America, the birthplace of aviation, was in the arms of Morpheus. The World War gave an impetus to the development of aeronautics, and within a few months after the war started, Congress, under the administration of our great war President, Woodrow Wilson, acted with commendable vision in recognizing that aeronautics was a new science about which the world knew but little and Americans less. Congress saw the need for providing a foundation for the advancement of this new science through an organization especially created to direct and conduct fundamental scientific research to develop the possibilities of aircraft, both for military and commercial purposes. Thus was the National Advisory Committee for Aeronautics brought into being. This organization, located at Washington and Langley Field, Va., has been provided with the finest aeronautical research laboratories in the world. It has developed new and unique research equipment and methods which enables its scientific staff to learn some amazing facts about the controlling effects of natural laws governing the flight of aircraft. For example, they can in a single flight, with an airplane especially equipped for flight research, accurately, automatically, and continuously record, from the moment the airplane begins to roll along the ground preparatory to take-off, until it lands, everything that happens, including: The force with which it strikes the ground on each bump as it rolls along in the take-off; the length of run and ground speed in the take-off; the position of the controls; the energy exerted by the pilot in the movement of the controls; the airspeed; the flight path of the airplane, including maneuvers such as the loop, barrel roll, the Immelman turn, the vertical dive, etc.; the engine revolutions per minute; the distribution of the load over the lifting surfaces, and the rapidity and extent of the increase of the load as the airplane goes through violent maneuvers; the accelerations on landing; and the length of run before coming to a stop. All this information is necessary to provide accurate design and safety factors for both military and commercial airplanes.

Let me attempt to illustrate what knowledge of the distribution of the load, for instance, means. Suppose a given airplane weighs 3,000 pounds and has 300 square feet of wing area or lifting surface. The average load would be 10 pounds per square foot, but even in steady flight the load is not evenly distributed. The front edge of the wing carries a great deal more of the load than does the trailing edge, and when the airplane is sharply pulled up from a dive, for instance, the load may build up to eight or ten or even twelve times the weight of the airplane, that is to say, that airplane structure in the act of pulling out of a dive may have to support not 3,000 pounds in the air, but eight or ten or twelve times 3,000 pounds. It is of great importance therefore to know what portions of the wings have to carry this great increase in load and how rapidly the load builds up, in order that the airplane structure may be designed to sustain the shock and carry the load with safety.

An airplane equipped for such research in flight is virtually a flying laboratory, but supporting it is a ground organization and a laboratory staff, and back of that is the membership of the Committee and of its technical sub-committees. The physical equipment of the ground organization comprises a number of wind tunnels, large and small, including the variable-density tunnel, for testing models in compressed air; the propeller research tunnel, for research on full size propellers; the full-scale tunnel - the largest in the world - for research on full size airplanes; the vertical wind tunnel, for

studying and measuring the spinning characteristics of airplanes; the refrigerated wind tunnel for investigating the problem of ice formation in flight; the free-spinning wind tunnel for observing under controlled conditions the free spinning characteristics of airplane models in an ascending column of air; and a high-velocity jet-type tunnel for studying the design of propeller tips. In addition to the wind tunnels, there are an instrument laboratory, an engine research laboratory, a flight research laboratory, and a hydrodynamic laboratory. The latter, known as the N.A.C.A. tank, is a seaplane towing channel in which models of seaplane floats and of flying-boat hulls are investigated at water speeds up to the take-off speed of seaplanes.

The Committee's laboratories are known as the Langley Memorial Aeronautical Laboratory and, as stated, are located at Langley Field, Va., on land set aside for the Committee's use by the War Department. The problems comprising the research programs are approved by the main Committee upon request of the War, Navy, or Commerce Departments, upon recommendation of one of its technical subcommittees, or upon its own initiative. The main Committee is composed of fifteen members appointed by the President and serving as such without compensation. They comprise two representatives each of the War and Navy Departments, from the offices in charge of military and naval aeronautics; one representatuve each of the Smithsonian Institution, the U.S. Weather Bureau and the National Bureau of Standards; together with eight additional persons (including a representative of the Bureau of Air Commerce, Department of Commerce, who are "acquainted with the needs of aeronautical science, either civil or military, or skilled in aeronautical engineering or its allied sciences."

The law provides that the National Advisory Committee for Aeronautics shall "supervise and direct the scientific study of the problems of flight, with a view to their practical solution * * * "and also "direct and conduct research and experiment in aeronautics." Briefly, the general functions of this Committee may be stated as follows:

1. Coordinate the research needs of aviation, civil and military.

2. Prevent duplication in the field of aeronautical research.

3. Conduct under unified control of Committee in one central Government laboratory fundamental aeronautical research, including:

   (a) Confidential research for the Army and Navy on which they rely for supremacy of American military aviation.

   (b) Fundamental research to increase safety and economy of operation of aircraft, military and civil.

4. Advise War, Navy, and Commerce Departments and the aviation industry as to the latest research information.

5. Consider merits of aeronautical inventions submitted by the public to any agency of the government.

6. On request of the President, the Congress, or any executive department to advise upon any special problem in aeronautics which may be referred to it.

Through the personal contact of the heads of the War, Navy and Commerce air organizations serving as members of the National Advisory Committee, and of their chief technical subordinates serving as members of the technical subcommittees, there is effective coordination of the research needs of aviation, resulting in the preparation of research programs that eliminate duplication of effort. A major portion of the research program originates with requests for assistance from the Army and Navy. As a result of the representative character of this organization every desired cooperation is cheerfully given by the War, Navy and Commerce Departments. Usually the results of research are published promptly by the Committee and are made available to all concerned, but on request of either the Army or Navy in specific cases some of the most valuable discoveries of the Committee are kept confidential, at least until they first find application in new design of American aircraft.

The Army Air Corps and Bureau of Aeronautics, as well as the Bureau of Air Commerce and the aircraft industry, rely upon the National Advisory Committee for Aeronautics for the conduct of the fundamental scientific research that is necessary to enable them to keep at least abreast of European developments. The research results are usually applicable alike to military and to civil aviation. The work of the National Advisory Committee for Aeronautics has been so general and valuable that it is impossible today to design a modern efficient airplane without using the results of the Committee's researchers. The work of this organization is not only of great current value, but in time of war will become a vital factor. There is no way to measure the value of superior performance of aircraft in warfare, for aerial supremacy is quite likely ultimately to be decisive of a war; nor even in time of peace can a money estimate be placed on the savings in life and property due to improved safety in the operation of both military and civil aircraft.

The value in dollars and cents of improved efficiency in aircraft resulting from the research of the National Advisory Committee for Aeronautics can, however, be fairly estimated. The National Advisory Committee for Aeronautics is one governmental agency giving a splendid return to the taxpayers for the appropriations it receives, and in economic value is making possible annual savings in military and naval aviation alone in excess of its appropriations.

The remarkable record of improvement in the performance, efficiency, and safety of American aircraft during the past twenty years is largely the result of the continuous prosecution of organized fundamental research by the National Advisory Committee for Aeronautics. In this the scientific talent of America has been marshaled in a sustained effort to have the United States in the forefront of progressive nations in the development of aeronautics.

The factors most largely responsible for the great success of the National Advisory Committee for Aeronautics is its status as an inde-

pendent Government establishment. In my opinion, it deserves the appreciation of this country for its concentration on the function assigned to it by law and for the great credit it has brought to the United States and to American aviation by its outstanding contributions to aeronautical progress, made possible by the truly patriotic and unselfish devotion to duty and service without compensation of its eminent membership. The membership includes not only the responsible governmental officials concerned with the technical improvement in aircraft, but also such outstanding aeronautical authorities as Orville Wright and others, all serving under the able chairmanship of that inspiring leader in aeronautical science, Dr. Joseph S. Ames.

The Air Corps Materiel Division, located at Wright Field, Dayton, Ohio, for purposes of experimental development, has the Aircraft Branch, Power Plant Branch, Materials Branch, Equipment Branch, and last but not least, insofar as the military airplane is concerned, is the Armament Branch.

The Aircraft Branch is divided into six major laboratories.

The Structures Development and Test Laboratory is charged with stress analysis of all aircraft submitted to the Air Corps, testing the structural strength of those purchased, and developing, through test and research, new methods of assembling aircraft structures. To this group the world owes the all-metal monocoque airplane, and through its efforts there is now being constructed the first sub-stratosphere airplane, complete, with supercharged cabin.

The Special Research and Test Laboratory is charged with the preparation of airplane design studies from which military characteristics are established, the preparation of specifications covering the airplane proper, the evaluation of the airplane proper submitted on competition to the Air Corps, and the correction of unsatisfactory design features after the airplane is in service.

This laboratory is constantly investigating new and novel designs and design details and developing standards wherever they apply. One of its primary functions is the development of projects of extremely experimental nature which are usually of secret status.

The Propeller Research and Test Laboratory passes upon the design, and conducts exhaustive tests to determine the characteristics of each type of propeller accepted by the Air Corps. In addition, it is continuously engaged in research and development of new types. The field of its endeavors has been greatly increased by the introduction of controllable and constant speed propellers and by the rapid rise in engine horsepower. This Laboratory conducts all the propeller tests for the Navy and Department of Commerce and is the prime source of propeller engineering data in the United States. It is at present engaged in the development of opposite rotating propellers on a single shaft, a project made necessary by the introduction of great horsepower in airplanes of short span.

The Aerodynamic Research and Test Laboratory is engaged in developing methods of calculating performance, predicting performance by means of the wind tunnels, and actually measuring the performance of an airplane in flight.

This laboratory has made many contributions to the theory of aerodynamics and to the technique of wind tunnel operation. Its latest development is the photographic method of measuring performance in landing and take-off. At present it is engaged in developing methods for measuring static thrust, ground friction, and net accelerating forces of actual airplanes as well as a method for measuring torque and thrust of an engine-propeller combination in actual flight. The Laboratory has contributed much to the establishment of criteria for aerodynamic shapes, such as control surfaces, fairings, fillets, and the like, and for this purpose operates two wind tunnels of 265 m.p.h. and 500 m.p.h. velocity, respectively.

The Accessory Design and Test Laboratory is charged with the development and test of wheels, brakes, tires and tubes, landing gear complete with retracting mechanism, skis, floats, hulls, and allied parts of the airplane. Wheels and brakes are constantly being tested in order to produce correct drum and brake lining combinations; and oleo legs and retracting mechanisms are tested for each type of airplane. This Laboratory is at present engaged in perfecting hydraulic and pneumatic mechanisms for use on aircraft, a new type to replace the streamlined type now in service, and a radically different type of landing gear designed for instrument landings and take-offs, otherwise known as the tricycle gear.

The Lighter-than-Air Unit is engaged in the development of Air Corps balloons and balloon accessories, and in the correction of design faults which develop in service. This unit is largely responsible for the TC-13 and is now projecting plans for the development of future Air Corps types.

The chief function of the Power Plant Branch is to keep the propeller turning. Without any lengthy discussion, we all know that when the propeller stops everything else stops. Years ago, in the days of iron men and wooden ships and poor engines, forced landings were frequent and, thanks to slow airplanes, a cow pasture usually sufficed. Today most cow pastures are not quite large enough for our high performance airplanes, especially if loaded. A proportionate increase in engine reliability now lessens the possibility of that awakening clatter, that sputter, that puff of smoke, that splatter of oil, followed by that awful silence as you start gliding down to a forced landing, or a jump if old terra firma under you does not look so good.

The Power Plant Branch has contributed its share to the development and research of modern engines and accessory gadgets. Its chief concern is to give to the service the best, the most reliable engine at the earliest possible date. It works in conjunction with the various manufacturers who produce the finished product for test. The test consists of running the engine at various speeds and power loadings with controlled temperatures and pressures, simulating standard sea level conditions and the various conditions at altitudes.

In the Power Plant Branch they must prove themselves capable of routine, day-to-day, con-

tinued military service. Does number so-and-so cylinder cool properly? Does such and such a bearing get sufficient oil? Are the clearances on such and such a part too large or too small? Why did the case crack after so many hours on the test stand? Why the excessive vibration at such and such an r.p.m.? And so on for hundreds of other minor troubles found in type tests of engines. It is best to find out all these troubles on the test stand rather than over the Alleghenies with ceiling zero.

The Power Plant Branch activities during the past fiscal year have been concentrated on increasing the power output of engines in service, development of new types of engines, improved fuels to permit greater power output and lower fuel consumption, an extension of supercharging to higher powers and altitudes, and the designing of an oil dilution system for cold weather starting. Considerable progress has been made in the development of engine accessories, such as vacuum pumps, long reach spark plugs, magnetos and shielding, engine-driven gear boxes for accessory drives, hydraulic fuel pump drives, fuel pressure regulators, automatic oil temperature control valves, automatic supercharger regulators, automatic mixture controls, fuel injectors and controls, and hydraulic engine controls, all for the benefit of those who fly. The general trend in engine improvement is to take as much responsibility as possible from the pilot's already crowded mind, by replacing the great mass of control handles and gadgets by fool-proof automatic controls, out of sight and, we hope, out of mind.

The Materials Branch combines the functions of a service organization and an experimental laboratory. In the former capacity, it does a large amount of testing in connection with the Procurement Program of the Air Corps and acts as a control laboratory by preparing specifications and developing and maintaining standards for the testing and inspection of material and processes at the contractors' plants. Experimental development may be divided into two categories, one which determines the applicability for aircraft construction of materials submitted by the Industry to the Materiel Division, and the other which requires the development of a new process or material in which the industry may not be interested on account of its limited application.

A wide variety of products is covered. Not only are the materials for the construction of airplanes, enginesand accessories constantly being improved, but there are hundreds of items used in connection with maintenance for which specifications must be prepared since no other Government agency is interested.

The probability that airplanes will fly at high altitudes has brought up many questions in connection with materials for this service. The properties must not change at the lower temperatures. Complete properties of all the structural material under static, impact, and vibration are being obtained in a room refrigerated to -50° F. The windows must withstand an internal pressure and it became necessary to obtain the physical properties of glass and glass substitutes. New resinous materials with the transparency of glass, but considerably stronger offer a solution to this problem.

In the field of materials, competition is very keen and new materials are constantly replacing the older ones. Each new material brings up fresh problems in connection with fabrication, protection from corrosion, as well as a study of its fundemental properties in tension, twisting and fatigue. To carry out this work requires laboratory equipment of high accuracy and a wide range of adaptability. The laboratory at Wright Field has facilities for determining the presence of the most minute amount of an element in a material by means of its spectrum, or can test to destruction full-size parts for airplanes which may carry a load of 600,000 pounds.

The Equipment Branch of the Engineering Section consists of six Laboratories, viz: Instrument and Navigation, Electrical, Parachute and Clothing, Aerial Photographic, Miscellaneous Equipment, Physiological Research.

There are approximately 500 items of ground and air equipment for which this Branch is responsible - research, development, and standardization.

The Instrument and Navigation Laboratory. A Douglas C-33 airplane for the conduct of experimental flight tests in connection with the various projects under development has recently been assigned to this laboratory. This airplane has been utilized in testing such devices as improved gyro octants, drift sights and signals, automatic pilots, and navigation computers of various types.

Among the interesting projects now under development is a tachometer that records engine running time. In addition to the pointer which indicates engine r.p.m., two small dials are provided, one to indicate accumulated engine time up to 500 hours, the other to indicate "trip" time. Only the latter counter can be reset from the face of the instrument.

A synchronous control for multi-engine installations has shown promise of early accomplishment. An experimental model of this device has been operating on bench tests and automatically synchronizes speeds much better than can be accomplished by manual control.

Instrument test equipment of a portable nature is nearing completion and it is anticipated the service activities will be supplied with this essential equipment in the near future.

Aircraft and ground lighting equipment are keeping pace with the requirements of advanced aircraft and the needs of the latest landing field installations. New equipment under development includes portable-by-air lighting equipment for landing fields.

Electrical development has been characterized by exploration into the field of alternating current for aircraft application. An experimental installation has been made during the present fiscal year.

Present parachute development is concerned with high-speed opening parachutes for use in the faster airplanes.

Aerial photography. A self-contained photographic laboratory automobile trailer unit has been developed having one room completely equipped for printing and one for film processing and print finishing. The Unit houses its

own ventilating system, water supply, electric power plant, chemical and material supply, together with all photographic accessories necessary to produce complete mosaics wholly within the Unit.

One of the most interesting projects of the Physiological Research Laboratory is an investigation of the effect of centrifugal force on pilots. The equipment for this research consists of a long rotating arm with a seat bolted to its outer end. Powered by a large electric motor, this arm is rotated at speeds up to 80 r.p.m., at which speed a force of twenty times the pull of gravity is developed. Members of the laboratory are acting as experimental subjects up to 8 "G's" and anesthetized experimental animals for the higher forces which may produce permanent or fatal injuries.

The Armament Branch is responsible for the development of all items of armament equipment necessary to the complete complement employed in military aircraft, with the exception of those furnished by other Supply Branches of the Army, in which cases the Armament Branch is responsible for the provision of correct installation and proper functioning.

Also located at the Materiel Division is the Aircraft Radio Laboratory. Recently the work of this laboratory has been concentrated on the development and application of radio in the Air Navigation field. Radio compasses and direction finders have been improved - a light weight direction finder or homing device has been developed for Pursuit airplanes. Tests of a loop wound around the engine cowl have given great promise. New instrument landing equipment has been developed and improved.

A radio range marker for indicating the position of radio range stations provides a more positive indication than the cone of silence and will operate the present type of marker beacon receptor.

Several interesting problems, such as the control of the direction of flight by means of a radio compass and an automatic pilot, and the automatic selection of frequency settings on the radio compass by the action of the marker beacon receptor have reached laboratory solutions, and with slight modifications in the present laboratory designs, should be ready for procurement shortly, if needed.

The foregoing developments indicate that it will be but a short time until all airplanes will be equipped with efficient and satisfactory radio equipment for all purposes.

Other interesting problems too numerous to mention here, including ultra high-frequency work, are being carried on or will be set up in the development program for the next few years.

So long as the development of aviation continues from year to year, the military and naval policies and programs of our national security and defense are necessarily subject to change, as they are largely dependent upon the probable use of aviation in future wars. So long as other nations are seriously engaged in the development of aviation, America must at least keep abreast of the progress of aviation abroad and never permit itself to fall behind.

It is only through the strong and healthy support of our agencies for scientific research and experimental development that the preeminent position of the United States in aeronautics can be maintained.

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HAWAIIAN STUDENTS VISIT LUKE FIELD

The 5th Composite Group, Luke Field, T.H., was again honored on April 9th by a visit of local R.O.T.C. students.

Fourteen cadet officers from Punahou School, accompanied by their instructor, Captain H.W. Barrick, Infantry, were met upon arrival at Luke Field and taken to the 23rd Bombardment Squadron hangar, where the different types of Bombardment airplanes were explained in detail, including a brief lecture on machine guns, bombs, bomb racks and radio equipment. The comments of Captain Barrick, Professor of Military Science and Tactics at Punahou School, will serve to illustrate the benefits of such visits:

"The visit to Luke Field made by the R.O.T.C. students from Punahou last Friday was a great success from their point of view.

They learned much and came away enthusiastic over flying. They were impressed by the thoroughness of the overhauling and inspections in the depot. The cost of airplanes, motors, etc., surprised them. It was extremely enlightening.

This, I feel, is valuable education for them and of benefit to the government; just now this cannot be determined definitely. However, in just a few short years some of these youngsters will be community leaders here and elsewhere. Their sympathy for the Army is established and the benefits they will bring to it eventually will be ample payment for the kindness shown them now.

We appreciate your kindness in permitting the visit. We wish to thank you, Major Melville, and the other officers for their kindnesses, courtesies and efforts in making it a pleasurable and profitable visit."

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DISTINGUISHED FLYING CROSS AWARDED LANGLEY MEN

For their part in the rescue of seven Civilian Conservation Corps enrolees stranded on an ice flow in Cape Cod Bay last year, two officers and two noncommissioned officers of Langley Field, Va., were given citations for "extraordinary achievement" and presented Distinguished Flying Crosses during impressive ceremonies at the Langley Field Air Base on April 27th.

The recipients were Major Barney M. Giles, of the 20th Bombardment Squadron; 2nd Lieut. James H. Patrick, Jr., Air Reserve; Staff Sergeant Donald E. Hamilton and Corporal Frank B.Connor, both of the 96th Bombardment Squadron.

These four men on February 9, 1936, took off at night under dangerous flying conditions to aid seven C.C.C. enrolees stranded on an ice floe in Cape Cod Bay. They located the men, dropped a message to them, and were credited with being chiefly responsible for saving their lives. Major General Frank M. Andrews made the formal presentations during a formal review represented by officers, flying cadets and enlisted men of all GHQ Air Force units at Langley.

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